Achievements of UNRRA as an International Health Organization

WILBUR A. SAWYER, M.D., LL.D., F.A.P.H.A.

Director of Health, United Nations Relief and Rehabilitation Administration, Washington, D. C.

SO astounding is the magnitude of the overall performance* of the United Nations Relief and Rehabilitation Administration, with its mammoth shipments to war-ravaged countries of food, clothing, agricultural seeds, implements, and other essential supplies, that the strictly health functions are dwarfed by comparison. Nevertheless, in order to meet its responsibilities during the emergency, the Health Division of UNRRA had to expand until it became by far the largest international health organization which the world has yet seen. This is true even if the coöperating Division of Medical and Sanitation Supplies* is not included.

The extent of UNRRA's operations was dramatically illustrated by a comment of Mr. Noel-Baker[1] at the recent session of the Council of UNRRA at Geneva:

> During the war I was a Minister under Mr. Churchill in our Department of War Transport, and month by month I used to watch the convoys which brought to Britain the food and the raw materials with which we fought the war. The scale of UNRRA's supply operations each month is now equal to the total import programme of the United Kingdom in those historic times.

For UNRRA's entire period of active operations lasting about three years, the total budget amounts to approximately 3 billion 7 hundred million dollars. When the Administration closes its books next year it is estimated that its health work will account for close to 168 million dollars. The largest portion of this amount, or about 146 million dollars, will have been spent for procurement and shipment of medical and sanitation supplies. By June 30, 1946, 105,000 tons of sera and vaccines, chemicals and drugs, hospital equipment, and laboratory supplies had already been dispatched, and about an equal amount was still to go forward. The estimate of 22 million dollars for the health activities exclusive of expenditures for supplies was reached by prorating the total estimated operational and administrative expenditures up to December 31, 1946, according to the numbers of international employees engaged in health and the number in the total functions and thus determining the share belonging to health.

The maximum annual expenditure of UNRRA for health is that for 1946, estimated as about 14 million dollars for the activities of the Health Division plus 68 million dollars for the procurement and shipment of medical and sanitation supplies. This gives an estimated sum of 82 million dollars for health, medicine, and sanitation during that year. The annual sum for health activities was substantially increased by allotments by certain governments from the proceeds of sales of part of their

* The Division of Medical and Sanitation Supplies, responsible for procurement and distribution, is in the Bureau of Supply, while the Health Division, under the Director of Health, is in the Bureau of Services.

UNRRA supplies. Such sales to persons who could afford to buy were permitted on condition that the net proceeds in local currency should be turned back into relief and rehabilitation activities.

The size of UNRRA's effort in the field of international health can best be appreciated if we mention for comparison a few other important annual health budgets. The League of Nations Health Organization had the equivalent of U. S. $414,078 in its largest annual budget, the one for 1931, and did valuable pioneering work with these resources. The Interim Commission of the World Health Organization is reported to have a budget of $300,000 for the remainder of 1946 and $1,000,000 for 1947. The International Health Division of the Rockefeller Foundation for the calendar year 1945 had a budget of $2,200,000 for its regular program and expended also $157,016 from the special war funds of the Rockefeller Foundation Health Commission. The United States Public Health Service has a total budget for the fiscal year ending June 30, 1947, of $88,423,516, including $290,700 for its new Office of International Health Relations. All the 48 states of the United States of America together appropriated about 50 million dollars for health for the year ending June 30, 1946, and the corresponding figure for the local governments is about 70 million. These comparisons bring out the magnitude of UNRRA's total expenditures for health. They had to be large because the requirements for relief health services and

TABLE 1

International and Local Professional Health Personnel by Profession and Place of Duty June 30, 1946

	International Employees						
Place of Duty [1]	*Physicians*	*Dentists*	*Nurses*	*Sanitary Engineers*	*Other Professions*	*Total*	*Local Employees*
Headquarters—Washington	7	0	2	1	4	14	0
European Regional Office	10	2	2	0	1	15	0
Albania	1	0	0	0	0	1	0
Austria	36	1	28	0	0	65 [2]	0
Belgium	1	0	1	0	0	2	3
Byelorussia	1	0	0	0	0	1	0
China	90	18	32	14	20	174 [3]	11
Czechoslovakia	1	0	0	0	0	1	1
Dodecanese	1	0	5	0	0	6	0
Ethiopia	1	0	2	1	0	4	0
France	2	0	0	0	0	2	2
Germany	280	7	348	4	1	640 [2]	43 [4]
Greece	27	1	52	8	26	114	79 [5]
Hungary	0	0	0	0	0	0	1
Italy	18	1	27	2	11	59 [2]	79 [6]
Middle East	4	0	9	2	2	17 [2]	1
Poland	4	0	2	2	1	9	4
Ukraine	1	0	0	0	0	1	0
Yugoslavia	4	0	2	2	1	9	5
	489	30	512	36	67	1,134 [2]	229
							1,134
Grand Total							1,363

[1] There was no professional health personnel in Finland, Korea, or the Philippines, where activity was exclusively on supplies.

[2] Occupied exclusively with Displaced Persons: Austria, 55, Germany 640, Italy 5, Middle East 17. Total 717.

[3] Including "program personnel" for clinical work and teaching, 113 (59 Physicians, 17 Dentists, 20 Nurses, 5 Sanitary Engineers, 12 Other).

[4] Including 34 Physicians and 9 Nurses.

[5] Including 20 Physicians, 19 Nurses, 24 Sanitary Engineers, and 16 Other.

[6] Including 25 Physicians, 10 Dentists, 44 Nurses.

TABLE 2

International Professional Health Personnel by Profession and Nationality
June 30, 1946

Nationality	*Physicians*	*Dentists*	*Nurses*	*Sanitary Engineers*	*Other Professions*	*Total*
Australia	7	0	12	0	0	19
Austria	2	0	1	0	0	3
Belgium	28	0	76	0	0	104
Bolivia	1	0	0	0	0	1
Brazil	9	0	0	1	0	10
Canada	8	1	28	0	2	39
China	1	0	0	0	0	1
Colombia	7	0	0	0	0	7
Cuba	13	1	0	0	0	14
Czechoslovakia	20	1	1	0	1	23
Denmark	9	0	43	0	1	53
Dominican Republic	1	0	0	1	0	2
Eire	18	0	21	0	0	39
El Salvador	2	0	0	0	0	2
Equador	1	0	0	0	0	1
France	51	0	50	0	0	101
Greece	6	0	0	1	0	7
Hawaii	1	0	0	1	0	2
Holland	13	0	68	0	1	82
Honduras	0	1	0	0	0	1
Iran	3	0	0	0	0	3
Italy	0	0	13	0	0	13
Luxembourg	3	0	1	0	0	4
Mexico	12	0	0	2	0	14
New Zealand	1	0	6	0	0	7
Norway	2	0	5	0	0	7
Palestine	3	0	0	0	0	3
Poland	31	0	2	0	1	34
South Africa	2	0	1	0	1	4
Stateless	10	0	3	0	0	13
Switzerland	8	0	4	0	0	12
U. K.	100	13	61	5	27	206
U. S.	90	13	106	25	29	263
USSR	1	0	0	0	0	1
Venezuela	3	0	0	0	0	3
Yugoslavia	3	0	0	0	1	4
Unknown	19	0	10	0	3	32
Totals	489	30	512	36	67	1,134

supplies were extreme at this time of unprecedented emergency.

THE STAFF OF THE HEALTH DIVISION

The professional staff of the Health Division at Headquarters in Washington, at the European Regional Office in London, in the China Office, in the displaced persons operations in Germany, and in the Missions to the several assisted countries, is shown by numbers, professions, and nationality in Tables 1 and 2, as of June 30, 1946. At that time recruitment of new personnel ceased and numbers were already beginning to decrease.

The recruitment of a large professional staff during the war was extremely difficult. In Great Britain and the United States, military needs had priority. Many other areas which were drawn on later were at first inaccessible. The Surgeon General of the United States Public Health Service and the Chief Medical Officer of the British Ministry of Health appreciated the international importance of the health activities of UNRRA and helped arrange for the temporary release of experienced personnel from positions in their countries. The U. S. Public Health Service also assigned many of its commissioned officers to service with UNRRA and in September, 1946, there still remained on duty with the Health Division 34 medical and 4 dental of-

ficers, 66 nurses, and 16 sanitary engineers.

The international professional staff was recruited principally from the 48 nations now participating in UNRRA and on as broad an international basis as possible. From Table 2 it will be seen that the 1,134 professional persons in the international ("Class I") category, included nationals of 35 countries and a few classified as stateless or unknown. The posts of greater responsibility were also widely distributed among the nations, as will be illustrated by a few examples. At Headquarters in Washington, the Director of Health came from the United States, the Deputy Director of Health from Czechoslovakia, the Chief of the Far Eastern Branch from China, the Chief of the Epidemic Control Branch from Brazil, and the Chief of the Branch of Medical and Sanitation Supplies from the United Kingdom. In the European Regional Office, the Regional Director of Health is from the United Kingdom, his Deputy from the United States, and the Chief of the Branch on Medical Services to Displaced Persons from France.

Chief Medical Officers for Country Missions and the China Office have been drawn from many countries; to cite only a few examples, from Yugoslavia for China, from Greece for Ethiopia, from the United States for Poland, and from the United Kingdom for Italy and Greece. The Chief Field Medical Officer in China is from El Salvador.

The international doctors and nurses fall into two categories, those with public health training and experience and those primarily concerned with the care of the sick. The public health group was invaluable in the administrative and supervisory offices, and in field work in their specialties. Most of the clinical staff were assigned to assembly centers for displaced persons or to hospitals and clinics for the general population, although a few were primarily engaged in teaching and demonstration. The volume of accomplishment was far beyond what the size of the UNRRA staff would indicate, for staff members worked side by side with a much larger personnel of the local health departments and medical institutions. In China, coöperation by the Health Division was facilitated by a parallel organization, the Health Commission of the Chinese National Relief and Rehabilitation Administration. In the 15 regions, the UNRRA personnel coöperated with their Chinese opposites in a combined effort to restore public health and medical activity to at least pre-war effectiveness as rapidly as possible.

Several hundred doctors and dentists found among the displaced persons were asked by UNRRA to help care for their fellows in the assembly centers. For example, in the British and United States occupation zones of Germany at the end of July, 1946, there were 152 dental clinics staffed by 311 dentists, nearly all displaced persons.

Certain principles determined whether a country desiring assistance needed a Mission and health services. Such assistance was available to invaded countries seriously damaged, and finally liberated from the enemy, which did not have enough foreign exchange to purchase the imports they needed. This was the case with Greece, Poland, Czechoslovakia, Yugoslavia, Albania, Ethiopia, China, Byelorussia, and the Ukraine.

Work was done also in ex-enemy countries under conditions determined by the UNRRA Council. These were Italy, Austria, and Hungary. In Germany, UNRRA assistance was given solely in the care of displaced persons. Limited assistance was given to the Dodecanese, Finland, Korea, and the Philippines.

In the assisted countries, the health staff, headed by a chief medical officer, is an integral part of an UNRRA Coun-

try Mission, and is under the overall direction of the Chief of Mission and his deputies. For technical guidance and general health policies there is, nevertheless, a close dependence on regional offices and headquarters. The international professional health staff in a Country Mission varies from one medical officer in Czechoslovakia and the Ukraine, for example, to 174 professionally trained people in China. However, what we have come to think of as a "standard mission," has at least a chief medical officer with public health training, a chief public health nurse, and a chief sanitary engineer at Mission headquarters, with field personnel in the districts assigned according to need. The large staff of 640 persons in Germany is occupied only with the care and health protection of displaced persons. Similarly engaged are 55 persons in Austria (29 physicians, 26 nurses), 5 in Italy (3 physicians, 1 sanitary engineer, and 1 nurse) and all 17 of the persons in the Middle East.

ORIGIN AND FUNCTIONS OF THE HEALTH DIVISION

When the future historian evaluates the work of UNRRA's Health Division, he will probably attribute greater significance to its service in bridging the war-caused gap in the evolution of international health organization than to its relief operations of a purely emergency nature. Many of the national health departments, on which the world health structure must rest, were inhibited or broken by the most widespread and destructive of all wars. There was an unprecedented shortage of materials, apparatus, transportation, communications and buildings essential to the protection of health and the maintenance of medical care. There was, in addition, disorganization, loss of trained personnel, and isolation from the newer health knowledge. The international bodies such as the League of Nations Health Organization and the International Office of Public Health in Paris, to which the affected national health departments would naturally turn for guidance and leadership, were cut off from most of their field of activity and were largely prevented from functioning. The International Health Division of the Rockefeller Foundation had been forced to terminate most of its activities in Europe, and had as a result deflected more of its attention to South America. The Pan American Sanitary Bureau, operating only in the Americas, was less disturbed. The experiences of these organizations, and the experts they had trained, were most valuable for the restoration of health departments in the liberated countries and in carrying forward the health work of UNRRA.

To face the challenging situation, UNRRA's Health Division was created in December, 1943. Forty-four nations had signed an agreement on November 9 establishing the United Nations Relief and Rehabilitation Administration. The Health Division started operations shortly after the first Council session, meeting in Atlantic City, had laid down in detail the purposes and objectives of the new agency, and had given it the necessary framework of instructions and authority.[2]

The functions of the Health Division may be summarized briefly as follows:

1. Assistance to national health authorities
   a. in the prevention of war-engendered epidemics,
   b. in the rapid restoration of national health departments,
   c. by assignment of technical staff for consultation and coöperation,
   d. in determining the requirements in medical and sanitary supplies to replace losses through destruction, looting, and the cutting off of sources, and in coöperating with UNRRA's Bureau of Supply in related technical matters of procurement and distribution.
2. Revision and administration of international sanitary conventions for maritime and aerial quarantine, as applied to signatory mem-

bers of the United Nations, and the carrying out of the specific duties imposed on UNRRA by the revised conventions.

3. Provision and technical supervision of medical and sanitary personnel for the care and health protection of persons displaced by war wherever UNRRA has responsibility for them in assembly centers, or camps, or during travel back to their countries.
4. Training of professional health and medical personnel of the assisted countries, in preparation for relief and rehabilitation work, through study fellowships in foreign lands and by supplying teachers and lecturers for courses in the assisted countries.

PREVENTION OF EPIDEMICS

The great wars of history have been accompanied and followed by sweeping epidemics, usually directly related to the devastation and hardship. In the recent World War, since the destruction was more widespread than ever before, the greatest catastrophes were to be expected. Multitudes of people were being driven from place to place. Thousands were crowding into makeshift dwellings. Scarcity of food, clothing, medical care, and even of pure drinking water was almost universal. And most of the health departments that had survived the war had been completely disrupted and so largely deprived of necessary personnel and supplies that they were quite ineffectual.

The only hope of avoiding major health disasters lay in the advances in medical science made since the previous World War and in early organization to apply this new knowledge effectively.

Appreciating the appalling risks to world health, the Council of UNRRA gave the Health Division a wider mandate with regard to epidemic prevention than in its other fields of activity. It authorized measures to control epidemics not only in liberated areas but also in enemy and ex-enemy countries with the purpose of preventing the spread of such epidemics to United Nations areas or to displaced persons of United Nations nationality.

Of the war-engendered epidemics to be expected, the one that presented the most alarming threat was typhus fever. Consequently, the Health Division felt the highest degree of responsibility for curbing it. Without control, widespread epidemics of typhus were inevitable. With control, safety was possible because of the effective new weapons which had been developed against the disease. UNRRA was in a position not only to secure and distribute vast quantities of DDT delousing powder, but through its field staff it could give directions as to the method of application.

The results have been highly gratifying. No great runaway epidemics of typhus have occurred as the result of the recent war. Credit must be given first to those who devised the practical and effective methods of delousing fully clothed persons by powdering with DDT. The Bureau of Entomology of the U. S. Department of Agriculture, the International Health Division of the Rockefeller Foundation, and the United States of America Typhus Commission all contributed invaluable evidence obtained through experiments and field trials. Before UNRRA had free access to some of the critical areas, the occupying armies, the U. S. A. Typhus Commission, and the International Red Cross here and there helped the local health authorities to keep the situation in check. As soon as the shipping lanes were cleared, UNRRA dispatched thousands of tons of DDT powder and many hundreds of dust pumps. UNRRA staff was sent in to help organize control and to give instruction in methods. A limited amount of typhus vaccine was supplied also but it was not used on a large scale in the general population, and therefore played only a secondary rôle. The size of UNRRA's effort is disclosed by the large amount of 10 per cent DDT delousing powder which is being distributed to the various countries, as shown in the first column of

TABLE 3

Total Program for Shipping DDT, by Recipient Countries

Recipient Country	For Typhus Control	For Malaria Control		
	10% DDT Powder	20% DDT Solution	26% DDT Solution	100% DDT Powder
	In Pounds	In Gallons	In Gallons	In Pounds
Albania	198,100	39,000	50,000	24,000
China	2,394,410	....	130,000	250,000
Czechoslovakia	216,040	....	....	6,450
Ethiopia	170,000	....	4,000	....
Greece	205,175	275,204	253,000	533,100
Hungary	8,900	....	....	....
Italy	224,640	....	225,000	406,000
Korea	100,000	....	....	....
Philippines	....	....	....	20,000
Poland	2,014,980	....	....	157,525
Yugoslavia	1,254,236	90,000	270,000	55,000
Totals	6,786,481 (3,393 tons)	404,204	932,000	1,452,075

Table 3. The other columns showing the amounts of DDT being shipped for use in malaria control will be referred to later. A single dusting of one person requires about 2 ounces of the 10 per cent DDT delousing powder, and it is effective for several weeks.

Probably the most practical estimate of the general results of the campaigns against typhus can be obtained by comparing the typhus incidence in Poland in the years 1919 and 1920, immediately after World War I, with the available figures for part of the corresponding period of 1945 and 1946, after World War II. This is done in Table 4 and Chart 1.

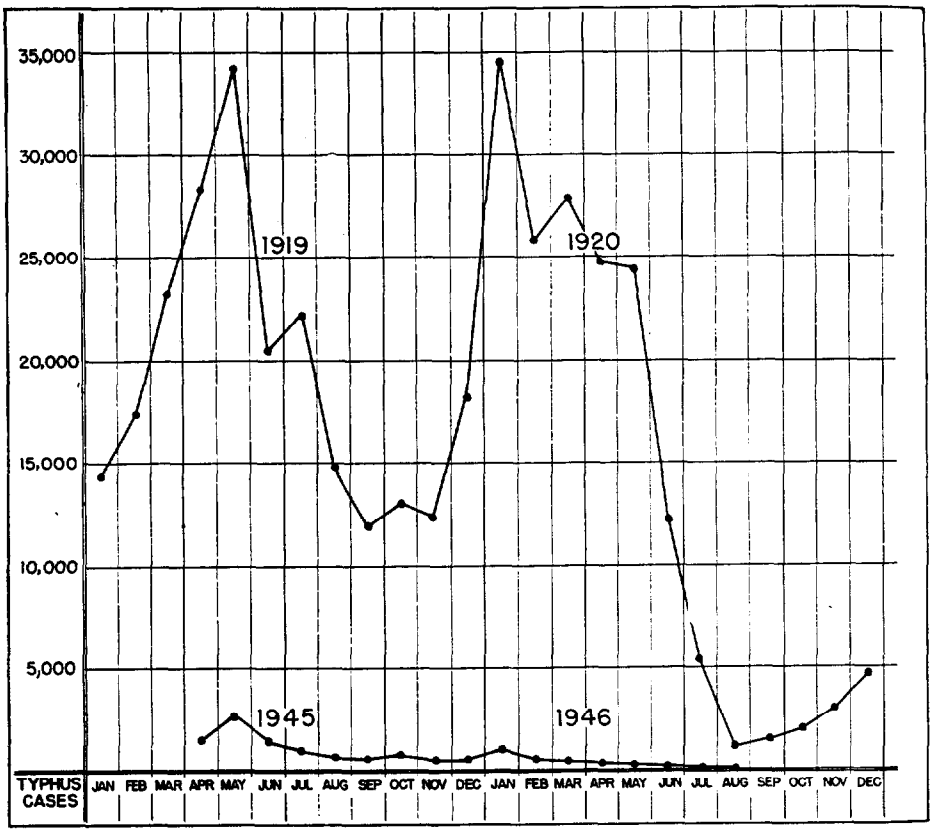
In 1919, the maximum monthly incidence was 33,929 cases in May. For 1945 our reported figures began with April, and the comparable peak seems to have been reached also in May with 2,987 cases, or less than one-eleventh as many as in May, 1919. In 1920 and the early part of 1946, the corresponding maximum figures, both of them in January, were 34,530 and 1,235, giving a ratio of approximately 28 to 1. The data for 1919–1920 are for Congress Poland and Galicia only, while those for 1945–1946 relate to the present territory of Poland, including the three former German provinces which came under Polish administration in September, 1945. Eastern Galicia is therefore excluded in the later period, but Poland

TABLE 4

Typhus Fever in Poland, 1919–1920 and 1945–1946

	Number of Cases		Number of Cases	
	1919	1920	1945	1946
January	14,207	34,530	....	1,235
February	17,061	25,858	....	635
March	23,272	27,843	....	516
April	28,190	24,616	1,867	417
May	33,929	24,339	2,987	221
June	20,445	12,329	1,795	89
July	22,287	5,366	1,536	99
August	14,735	1,388	794	78
September	11,986	1,650	782	47
October	12,980	2,195	869	....
November	12,382	3,013	601	....
December	18,333	4,576	682	....

CHART 1—Typhus fever incidence in Poland after World War I in comparison with the incidence after World War II



west of the German frontier of 1914 is included, which makes the two sets of figures fairly comparable. Moreover, the differences observed in the comparisons are so great that we are not attempting here to make allowances for changes of area or population. It is evident from the chart that typhus in Poland is being conquered and that the war emergency with respect to this disease is over. In fact, we are given hope that Poland could exterminate typhus before long by the modern methods which have been introduced. This result could be hastened by international planning with participation by Poland's neighbors as well.

A flare-up of typhus fever in Yugoslavia was also to be expected, for it was in Serbia that the great epidemic of 1915 occurred early in the previous World War. During that visitation, over 150,000 people died of typhus within a period of 6 months, and the daily admissions for typhus to military hospitals alone rose to the staggering height of 2,500. Nothing comparable was permitted to occur in the recent war, although the disease was epidemic in Croatia and Serbia before effective control could be initiated. The U. S. of America Typhus Commission was invited early to Yugoslavia to help control typhus. The Commission organized control by DDT dusting and vaccination and trained many persons in the

methods. Later UNRRA took over and continued to advise and to provide the necessary supplies. Typhus in Yugoslavia is steadily responding to control. There were about 50,000 cases in 1945, but only 3,000 in the first half of 1946.

The same rosy picture cannot be painted for another serious preventable disease. During my visit to Poland in November and December, 1945, I was astounded at the amount of typhoid fever then present. It was being largely attributed to the great amount of migration and to contact between cases. Unfortunately, we had no new techniques, comparable to the use of DDT in a dust gun, that could be used for combating epidemics of typhoid. Since then the Health Division has assigned two sanitary engineers to its Poland Mission in the hope that they can assist the trained sanitary engineers of the Ministry of Health in discovering and correcting some of the responsible conditions in the post-war environment.

In Table 5 and Chart 2 is shown for comparison the monthly incidence of typhoid and typhus fevers from April, 1945, to August, 1946. The great seriousness of typhoid and the present low incidence of typhus are clearly shown. The typhoid fever maximum in October, 1945, was 17,629 cases and the peak in May of the same year for typhus was only 2,987 cases. The three former German provinces now under Polish administration are included only from September, 1945. Later returns show

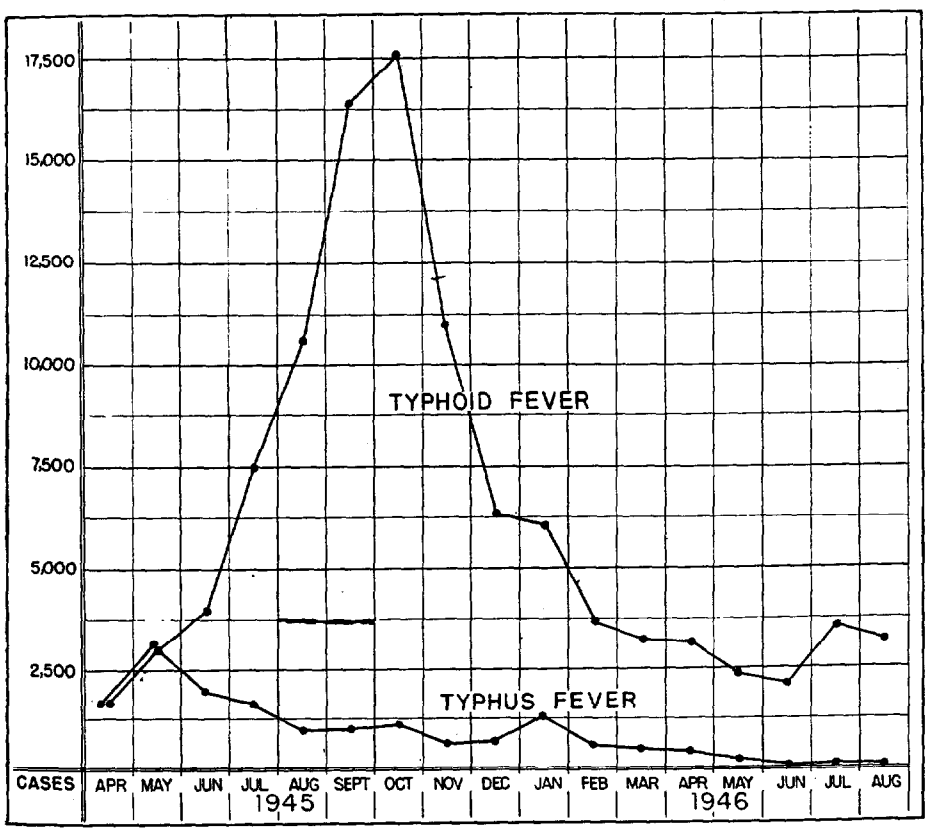


CHART 2—Comparison of typhoid fever and typhus fever incidence in Poland, April, 1945–August, 1946

TABLE 5

Typhus and Typhoid Fever in Poland, April, 1945–August, 1946

	Number of Cases	
	Typhoid Fever	*Typhus*
April, 1945	1,871	1,867
May	2,825	2,987
June	3,835	1,795
July	7,457	1,536
August	10,628	794
September	16,569	782
October	17,629	869
November	10,999	601
December	6,345	682
January, 1946	5,983	1,235
February	3,551	635
March	3,180	516
April	3,110	417
May	2,335	221
June	2,088	89
July	3,475	99
August	2,680	78
September	2,605*	47*

* Provisional figures

that typhoid seems definitely to be coming under control.

The war and post-war conditions that brought a marked increase in the prevalence of typhoid fever in countries of continental Europe would have spread cholera also, had it not been completely absent. In fact, the disease had not extended west of Iran since 1931. In China, on the other hand, cholera is endemic and was quite active in the summer season of 1946.[3] UNRRA was first called on for emergency help in fighting cholera in June of the previous year when an epidemic was developing in Chungking. An UNRRA team of 7 physicians and 2 sanitary engineers, with 6 tons of needed medical supplies, was flown to India and over the Hump to that city. Unfortunately, one installment of the supplies was lost over the Himalayas. The team took part in the control of the epidemic and the care of the sick.[4]

Early in March of this year (1946), I saw in the Contagious Disease Hospital of Canton the first five cases of cholera of the recent epidemic. Subsequently, other cities of China were involved successively. The experience of the larger ones is shown in Table 6. By mid-summer, cholera became active also in southern Manchuria, where it flared up in numerous localities. In July alone, 11,910 cases and 4,697 deaths were reported from 26 cities and 2 rural areas of Manchuria.

Assistance to the Chinese authorities in the control and treatment of cholera has been promptly given by the medical staff of UNRRA. Cholera vaccine for mass immunization, and even calcium hypochlorite for water purification, were flown to Canton early in its epidemic. Since then several emergency shipments of material necessary for fighting cholera and for treating the sick with intravenous salt solution and plasma have been sent by air directly to China from

TABLE 6

Cholera Cases in Certain Chinese Cities, 1946

Month	*Canton*	*Shanghai*	*Nanking*	*Foochow*
March	548	0	0	0
April	1,196	0 †	0 †	0
May	853	27 †	0 †	0
June	1,097	816	4	22
July	250	2,468	209	422
August	37	933	300	204
September	22 *	171	22	44 *
Total, Cases	4,003	4,415	535	692
Deaths	1,208	352	31	133
Case Mortality per cent	30.2	8.0	5.8	19.2
Population in thousands	1,000	3,500	700	325

* 20 days only
† Excluding imported cases

Toledo, Ohio. In Shanghai, two million cholera vaccinations had been performed by early July and this may have been one reason that the epidemic was losing momentum by the middle of that month. Investigations in connection with the cholera epidemics in Canton and Shanghai were carried out by an epidemiologist of the China Office.

Plague was almost completely kept out of the European post-war picture. It gained entry to the port of Taranto in southern Italy when the disease was present in the island of Malta. From September 3, 1945, to October 25, there were 25 cases in Taranto with 12 deaths. An anti-rat campaign was initiated. All the premises in the infected area were sprayed with 5 per cent DDT in kerosene to kill the potentially infected fleas, and about 20,000 workers were dusted weekly with 10 per cent DDT powder. UNRRA, as part of its coöperation, made available the advice of an expert on rat extermination. There was no spread to other cities.

In China, plague was a greater problem, but there was no really extensive epidemic after the country was liberated and opened to UNRRA. Since then, the focus centering in Fukien Province has been active.[5] In the early months of 1946, there was much concern over reports from Mukden of pneumonic plague in Manchuria. There were 39 cases with 36 deaths, and the recovery of 3 was attributed to treatment with sulfadiazine. This small outbreak stopped abruptly, but there were 13 additional fatal cases of plague early in March about 70 miles from Mukden. The National Health Administration is continuing the study and control of plague in the Fukien area, using supplies sent by UNRRA, such as plague vaccine, sulfadiazine, DDT for killing fleas, and poison for rats. UNRRA has also assigned to this work a team consisting of an epidemiologist, an entomologist, and a sanitary engineer.

Since Kala-azar is a disease transmitted by a bloodsucking fly, a species of *Phlebotomus*, it can hardly be regarded as a result of the war, although aggravated by the resulting neglect. There are about three hundred thousand persons near the Yellow River in Honan, Kiangsu, and neighboring Provinces, who have this serious disease in acute form and urgently need treatment. They have been cut off by the war from the source of supply of the antimony drugs that would cure them. UNRRA's Chief Medical Officer in China has urged that for the time being these drugs be given priority over all other medical supplies in shipments to China. Unfortunately, the world's entire manufacturing capacity for antimony drugs is not enough to fill the needs promptly and it is proving necessary to bring about the expansion of the facilities for production. The medical officers of UNRRA and CNRRA are not satisfied to limit their program to treatment alone and are hoping to use DDT supplied by UNRRA in an attack on the *Phlebotomus* responsible for transmitting the disease, thus initiating a program of real prevention. This may not get into full swing until more is known of the insect and its habits.

For several years, diphtheria has been the leading epidemic disease in a large part of Europe.[6] Great quantities of diphtheria toxoid for immunization and antitoxin for treatment are being shipped by UNRRA to the assisted countries. The amount of diphtheria toxoid in the supply program is 6,015,960 ml., or enough to immunize 2,406,384 persons. Diphtheria antitoxin is being supplied up to a total amount of 5,167,080,000 units. Material for the Schick test also is provided.

CURBING ENDEMIC DISEASES

The incidence of tuberculosis has gone up so high in the war-ravaged countries that this disease presents a serious and

lasting post-war problem, as it did after the first world war. Tuberculosis experts on UNRRA's staff have made surveys in many countries, using mass radiography, have analyzed the problem, have given advice as to the control of the disease, and have assisted in restoring and correcting the institutions for the tuberculous. Such a program has reached an advanced stage in Greece, for example, but is still far from complete.[7] The Greece Mission has a Chief Tuberculosis Consultant and under him are five area teams, each consisting of a tuberculosis specialist, nurses experienced in this disease, a radiologist, and a clerk. These teams travel from village to village, examining people to determine the extent of the problem, inspecting sanatoria and helping set up clinics, advising the authorities, and training technicians in the use of radiographic units. Some 70,000 persons have already been examined by mass miniature radiography. When tuberculosis has been dependably diagnosed, an effort is made to arrange for supplementary rations. Interest has been stimulated, an advisory National Tuberculosis Council has been organized, and there is large-scale coöperation from voluntary agencies. Supplies from UNRRA have been given to nearly every sanatorium and dispensary in Greece. Such supplies range from bedsteads and x-ray apparatus to drugs and special surgical instruments. All this is of great assistance to the governmental health authorities, who are facing an otherwise insuperable problem, for in Greece as in the other liberated countries the surveys reveal a marked increase in tuberculosis.

The results of the tuberculosis survey in Poland have been published by an UNRRA specialist.[8] He reports that the restoration of the sanatoria is going ahead and that much equipment has come from UNRRA. In Italy, the war against tuberculosis is benefitting not only from the UNRRA surveys and equipment but also from generous allotments by the government from the proceeds of sales of UNRRA supplies.

Wars produce a marked increase in venereal diseases, and World War II was no exception. Fortunately, treatment has become much more effective in recent years, and the knowledge of methods of control has also advanced. UNRRA has supplied large quantities of drugs useful in treating diseases of this class and has supplied information about their use. A specialist in venereal disease control and treatment has been attached to the UNRRA Mission in Poland, and several of the other medical officers possess special knowledge and experience in this field.

In the treatment and control of many diseases beside those here mentioned, there is a growing dependence on specific and effective drugs. Many of the older effective drugs were not generally available in the occupied countries during the war. The more recent ones were not known when the war started and had not been brought in when UNRRA began operations. The physicians and health officers were eager to get the newer drugs and biologicals and information regarding their effectiveness, safety, and methods of use. To illustrate the quantities in which drugs were supplied by UNRRA, I shall give a few items from UNRRA's total procurement program for the assisted countries: penicillin, 809,550 million units; insulin, 663,690 thousand units; various sulfa drugs, 1,074,265 lbs.; acetyl-salicylic acid (aspirin), 1,207,000 lbs.

CAMPAIGNS AGAINST MALARIA

Several of the liberated countries assisted by UNRRA have suffered long and intensely from malaria. The war increased the problem by disrupting drainage systems, depriving the public of suppressive and curative drugs, and in general interrupting the existing

activities against malaria. An extraordinary opportunity for widespread and systematic malaria control presented itself to the Health Division after these countries were liberated, and no time was lost by the sanitary engineers of the Division in organizing the field operations. The new methods which made cheaper and more effective control possible were the residual spraying of houses with DDT solution to destroy the adult mosquitoes and the distrtibution of the same insecticide from hand pumps or airplanes on water surfaces to kill the larvae.

The largest of the campaigns planned by UNRRA personnel in coöperation with the governmental health authorities were in Italy and Greece. The results were highly successful and the procedures were most popular. Not only did mosquitoes diminish and malaria almost disappear, but there was also a heavy incidental mortality among houseflies, bedbugs and fleas.

The campaigns in Italy were carried out with the approval of the High Commissioner of Hygiene and Public Health and with the coöperation of the Provincial Medical Officers and the antimalaria committees. The program depended mainly on residual spraying. It began in Sicily in January, 1946, and was continued first in Frosinone, then in the highly malarious strip of the south coast of Central Italy, and finally in the delta of the River Po. In the entire operation, the Italy Mission of UNRRA supplied technical supervision through its engineers. Moreover, it furnished 21 vehicles, 50 tons of pure DDT, 216,000 gallons of kerosene, 8,000 gallons of concentrated DDT emulsion, and the necessary sprayers. Twenty-five to 150 persons were engaged in spraying in each of the areas treated. These areas had an extent of 1,890 square miles and included about one-third of the total malarious territory of Italy, excluding Sardinia. The number of houses sprayed was 50,000; other structures similarly treated numbered 143,000; and the total area of internal wall space sprayed was 31,405,049 square meters. The good results gave rise to the prediction that a similar scheme of operations applied to all the malarious areas in future years could reduce malaria until it ceased to be a problem.

The preliminary work of an attempt to eliminate malaria from Sardinia by exterminating the anopheline species responsible for transmission has been started. This will be a joint project of the Government of Italy, the International Health Division of the Rockefeller Foundation, and UNRRA. The International Health Division is supplying the directing scientific staff, the Government is allotting funds for expenses from the proceeds of the sale of UN RRA supplies, and UNRRA is making available motor equipment, DDT, and other materials. Encouraged by the successes in eliminating *Anopheles gambiae* from Brazil and southern Egypt, the directors of the project are hopeful that a similar drive on the European anophelines responsible for transmitting malaria in this isolated island will result in their complete and permanent elimination.

The campaign against malaria in Greece was nation-wide from the start, and was planned and directed by the Chief Sanitary Engineer of the UNRRA Mission in coöperation with the Greek health officials. The methods all involved the use of DDT and included residual spraying of houses, distributing an oil solution of this larvicide by hand pump on small mosquito breeding places near malarious villages, and applying 20 per cent DDT as a thermal aerosol to large and inaccessible breeding places from 10 specially equipped airplanes. It is estimated that approximately 300 tons of DDT, in terms of the pure chemical, will have been used during

1946, or most of the supply designated for Greece in Table 3. For administrative purposes Greece was divided into 11 regions, in each of which there were an UNRRA medical officer and a sanitary engineer who worked in close cooperation with a Greek Government malariologist and a sanitary engineer. Seventeen planes were supplied by UNRRA, of which 10 are used in the regions. The other 7 are used for training pilots, for inspection trips, and as a source of replacement parts. Each plane can treat 17 acres per minute, and approximately 285,440 acres of mosquito breeding surface have been treated, counting each area every time it is gone over. The interval between treatments is about 15 days. This amount of operation by airplanes has required 17,840 gallons of 20 per cent DDT. Residual spraying has been applied to over 4,000 villages and towns to approximately 300,000 houses, stables, and other diurnal resting places for mosquitoes. The results of the combined methods seem to have been excellent and the people are enthusiastic. The fall survey should give a more accurate estimate of the reduction in malaria and its mosquito vectors.

The malaria experience of the Health Division seems to have demonstrated that it has at last become practicable and economical to control malaria on a national scale.

VARIOUS OTHER ACTIVITIES

It is natural that nutrition should be a prime interest of the Health Division in view of UNRRA's great responsibility to supply food under its relief program. Medical Nutrition Consultants and Dietitians of the Health Division made many surveys of the physical condition and diets of population groups suffering from food deprivation. Their primary duty was to report on the current state of nutritional health and to advise on matters of food and nutrition. The detailed survey for Italy has already been published.[9] Some of the specialists made observations of acute starvation in Germany, Holland, and China.. One of them organized a group of about 100 medical students and directed their efforts to save starving inmates of Belsen Camp by scientific methods.

In Italy, in addition to the study cited above, there was an extensive survey by the Italian Medical Nutrition Mission sent out by the Unitarian Service Committee and the Congregational-Christian Service Committee with the coöperation of UNRRA. They undertook to find out, by experimental feeding of malnourished children, what important food elements were most lacking, and to advise UNRRA as to needed supplements to the diets being supplied to hospitals. This team of medical scientists and laboratory technicians worked from April, 1945, to March, 1946, in six different parts of the country. It examined 28,651 persons, and gave service to 1,984.

In China, five CNRRA-UNRRA nutrition teams investigated the famine areas to determine their nature and extent. The results confirmed the existence of acute famine and general low caloric and protein intake, especially in Hunan Province. As a follow-up, special emergency supplies, including vitamin products and serum protein, were flown in from Shanghai. In the meanwhile every attempt was being made to hasten the sending of quantities of food.

The general conclusions in the reports from all countries investigated seemed to be that various degrees of underfeeding were encountered, sometimes actual starvation, but that frank deficiency diseases, such as scurvy, pellagra, rickets, and beriberi, were less frequent than would be expected. Of these diseases, rickets is the one most frequently encountered.

Consultants in maternal and child

health have made surveys and advised the governments and Missions. A school feeding program is a prominent feature in the Greek program, and the preschool children also receive attention.

Dental consultants have surveyed the needs in the several countries for dental care and have given special attention to the organization of dental services in assembly centers for displaced persons. The dental consultant attached to the European Regional Office has given lectures and demonstrations to the local dental profession.

The medical and surgical side of the rehabilitation of the disabled is a responsibility of the Health Division, although the other aspects have fallen to welfare workers and voluntary agencies. In Athens, a rehabilitation center has been sponsored by the Greek Government, UNRRA, and the Near East Foundation. The Health Division has provided an orthopedic surgeon consultant. Artificial limbs and materials for local manufacture and repair are being supplied.

A series of UNRRA facio-maxillary surgery teams was sent to Yugoslavia from London. The first, consisting of 6 persons, arrived near the end of 1945. These teams demonstrated the latest techniques for correcting mutilation, and trained local surgeons and nurses.

In many projects which have been mentioned voluntary agencies took an effective part. This was especially the case in the work with displaced persons in the Middle East Camps and in Germany. Voluntary agencies provided health personnel numbering about 500 for work in Europe and an additional number for China. They also contributed medical supplies for devastated areas.

INTERNATIONAL SANITARY CONVENTIONS

The occupation of France isolated the International Office of Public Health and interfered with its administration of the International Sanitary Convention of 1926 (Maritime) and the International Sanitary Convention for Aerial Navigation of 1933. This left international quarantine in so serious a predicament that something had to be done about it. To meet the situation UNRRA's Standing Technical Subcommittee on Health for Europe promptly appointed an Expert Commission on Quarantine to draft international sanitary agreements of an emergency nature.[10] The Commission later submitted to the Standing Technical Committee on Health in Washington drafts for two conventions, modifying and modernizing the existing ones. Each draft provided that UNRRA should carry out the duties previously assigned to the International Office of Public Health in Paris. After some modification in the light of the comments of member governments, UNRRA approved the proposed conventions and they were opened for signature at the State Department of the United States of America, the depository of the conventions. The required number of signatures was reached on January 15, 1945. The two conventions of 1944 came into effect on that date and have been administered since then by the Health Division from the Headquarters of UNRRA in Washington, with the European Regional Office in London acting as a branch for the regions in its sphere—Europe, Africa, and the Middle East. Headquarters makes notifications directly to China, Australia, New Zealand, Canada, and the United States, and through the Pan American Sanitary Bureau to the other American republics.

At Headquarters, the Division is publishing the semi-monthly *Epidemiological Information Bulletin,* carrying disease reports and epidemiological analyses. The European Regional Office is bringing out an additional fortnightly *Bulletin of Communicable Diseases and Medical Notes* for distribution to the governments in its area. A small *Weekly*

Epidemiological Bulletin is also sent out from London in printed form to give prompter information regarding the appearance and movements of serious diseases. Most of the reports to and from both offices with regard to pestilential diseases are transmitted by cable.

The duties imposed by the 1944 convention for aerial navigation include the delineation of the yellow fever areas of the world for purposes of quarantine, and also laying down standards for yellow fever vaccine and designating institutes approved for carrying out tests of the vaccines. These special functions have been performed by an Expert Commission on Quarantine appointed by the Standing Technical Committee on Health. In 1946 the Commission carried out an exhaustive test of the immunizing properties of the Dakar yellow fever vaccine administered by scarification, alone or mixed with smallpox vaccine. The Commission recommended that the method be certified as acceptable in the issuance and recognition of international certificates of inoculation.

All the duties imposed on UNRRA by the International Sanitary Conventions of 1944 and the Protocols prolonging them were of temporary and emergency nature. They will, therefore, be transferred to the Interim Commission of the World Health Organization on December 1, 1946, as agreed in letters exchanged by Mr. F. H. LaGuardia, Director General of UN RRA, and Dr. G. Brock Chisholm, Executive Secretary of the Interim Commission. Although the Central Headquarters of the Interim Commission will remain in New York, according to latest advices, the Epidemiological Office in charge of the administration of the conventions will be in Geneva.

The last issue of the *Epidemiological Information Bulletin* will appear on December 15. The two complete volumes will form a valuable compilation of statistics for reference with regard to the war and post-war period. Complete sets can still be made available to libraries and institutions requiring them.

MEDICAL CARE AND HEALTH PROTECTION OF DISPLACED PERSONS

In May of 1944, the responsibility for the six refugee camps in the Middle East was assumed by UNRRA. At the end of March, 1945, there were about 40,000 displaced persons in these camps, including nearly 15,000 children. The health staff contained specialists in nutrition, dietetics, tuberculosis, maternal health, child health, public health nursing, and sanitary engineering, and also clinical doctors and nurses. Since then, most of these refugees have been repatriated. Each returning group was accompanied to its destination by an UNRRA repatriation team, including a doctor and two nurses. There now remains only one of these camps, at El Shatt, with a few hundred refugees.

A problem of greater magnitude was presented by the displaced persons under UNRRA care in Germany, Austria, and Italy. At the end of May, 1946, there were 826,580 such persons in assembly centers in the three countries. The Health Division was responsible for recruiting the necessary health personnel and giving technical supervision. An extensive immunization program was undertaken. In most of the assembly centers a large part of the medical, dental, and nursing services was provided by professional persons found among the displaced persons, with overall supervision by UNRRA staff. Dispensaries have been set up and arrangements made for hospital care, mostly in local institutions with UNRRA supervision. Nurses among the displaced persons are being given refresher courses, and other women are being trained as nurses' aides, in order to replace UNRRA nurses as they are withdrawn. The health conditions in the

assembly centers have been on the whole quite satisfactory.

INSTRUCTION OF HEALTH PERSONNEL

In the long run much more is gained by training the nationals of a country to do their own health work than by introducing relays of foreigners to do it for them. For training for participation in relief and rehabilitation work in the field of health, UNRRA brought many Fellows from the assisted countries to educational centers of the United States and of the United Kingdom and other countries of Europe, and arranged for their studies and tours of observation. The first group consisted of 12 technical experts from China who came to the United States in 1944. After their return, many of them assumed key positions, becoming, for examples, Head of the Medical Commission of CNRRA, Director of Medical Supplies of this Commission, Director of the Anti-Epidemic Prevention Bureau of the National Health Administration, Director of Hospitals and Health Centers of the NHA, and Head of the Department of Sanitary Engineering in the National Institute of Health.

In 1946 a new program of UNRRA fellowships was offered, with 44 falling to the Health Division. The recipients included physicians, nurses, sanitary engineers, radiography technicians, and students of penicillin production. They received their instruction in the United States, Canada, the United Kingdom, Sweden, and Switzerland. In 1946 there was set up also a special Nurse-Teacher Fellowship project. The Fellows were carefully chosen graduate nurses interested in teaching, 121 in number. Twenty-seven came from Italy, 20 from China, 18 from Czechoslovakia, and 19 from Poland. This group received its special training in institutions of the Department of Hospitals of New York City, with brief observation trips to other centers. Twenty nurses from Austria and 17 from Greece were similarly trained in London.

In another of the training projects of the Health Division, medical teaching missions were sent to Poland and Czechoslovakia to visit the medical centers and bring the newer knowledge of the war years to the medical and dental professions. They had been almost completely isolated during the war years. The lecturers were provided for Poland and Czechoslovakia by a voluntary agency, the Unitarian Service Committee, with the coöperation of UNRRA. In Czechoslovakia, 14 lecturers from 8 universities began their tour in Prague and then went to Moravia and Slovakia, giving lectures and demonstrations in all 6 of the medical schools of the country. In Poland, the team of 7 lecturers included 2 dentists. It visited the principal cities, giving lectures to professional groups and students and leading discussions. Several lecturers had previously been sent to Poland by the Health Division, beginning in November, 1945, to get this valuable and much appreciated teaching started.

In 1945 a team of 11 teachers was sent to China to start a medical training program in conjunction with the National Institute of Health. The early courses in Chungking, with a total enrollment of 258 students, covered public health administration, medicine, surgery, gynecology, tuberculosis, public health and hospital nursing, maternal and child health, and bacteriology. A second series of courses was given in Peiping in the spring of 1946, with 136 students. In the interval between the two series, the teachers gave refresher courses to local medical societies and schools in Shanghai, Nanking, Peiping, and Tientsin. More recently they were assigned to medical schools in Peiping, Nanking, Chengtu, and Shanghai. Other technical personnel of the Health Division working in China have co-

operated in short courses or lectures for laboratory technicians, dentists, medical students, nurse trainees, field workers in rodent control, and medical supply officers.

The UNRRA nurse consultants in several countries, and especially in Greece, worked with the local nurse leaders in reopening and reorganizing schools of nursing and giving refresher courses in public health.

The Health Division's project in Ethiopia is essentially an attempt through teaching to take the first steps toward creating an indigenous medical and nursing profession. In this way, the ground work will be laid for a future public health service, and meanwhile the people will benefit from service of steadily rising quality. Courses for medical "dressers" and for sanitary inspectors are being conducted, and assistance is being given to the hospitals and clinics essential to this educational effort.

HANDING OVER TO A PERMANENT ORGANIZATION

The activities of UNRRA as here outlined are coming to an end, but many of the needs will continue and great opportunities stand open. So UNRRA has made its plans, in conference with officers of the Interim Commission of the World Health Organization, to hand over a number of its functions, on January 1, 1947, for Europe and Africa, and on April 1 for the Far East. The activities suggested for transfer to the Commission are (1) fellowships and teaching, (2) the project in Ethiopia, (3) tuberculosis, (4) malaria, (5) missions of experts to countries with special needs, and (6) the administration of these functions. To make possible the continuation of this work in the present UNRRA-assisted countries for approximately one year, after which the World Health Organization should be fully established, the Central Committee has authorized the Director General of UNRRA to turn over $1,500,000 to the Interim Commission. No supplement of the Commission's budget will be needed when the administration of the sanitary conventions is transferred on December 1.

The temporary Health Division will soon be giving place to a permanent and growing international health organization. On relinquishing their duties, the officers of the Health Division hope that their efforts have accomplished more than the alleviation of ravages of war. The World Health Organization should make a quicker start and be able to see its way more clearly because UNRRA, at a most difficult time, attacked the problems of international health.

REFERENCES

1. *Journal*, Fifth Session of the Council, United Nations Relief and Rehabilitation Administration, Geneva, 5:146 (Aug. 17), 1946.

2. Selected Documents. First Session of the Council of the United Nations Relief and Rehabilitation Administration, Atlantic City, New Jersey, Nov. 10–Dec. 1, 1943, pp. 139–148. UNRRA, Washington.

3. Stowman, Knud. (Notes on Cholera) *Epidemiological Information Bulletin* (UNRRA), 1:465–469, 551–561, 2:674–678, 718–720 (July 15–Sept. 15), 1945, 1946.

4. Reimann, Hobart A., Chang, G. C. T., Chu, L.-W., Liu, P. Y., and Ying, Ou. Asiatic Cholera. Clinical Study and Experimental Therapy with Streptomycin. *Am. J. Trop. Med.*, 26:631–647 (Sept.), 1946.

5. Fan, J. H. Communicable Diseases in China during Recent Years. *Epidemiological Information Bulletin* (UNRRA), 1:495–521 (July 31), 1945.

6. Stowman, Knud. The Diphtheria Situation in Europe. *Epidemiological Information Bulletin* (UNRRA), 2:147–158 (Feb. 28), 1946.

7. Vine, J. M. UNRRA's Health Campaign in Greece. *Lancet*, 250:789–791 (May 25), 1946.

8. Daniels, Marc. Tuberculosis in Poland. *Lancet*, 251:537–540 (Oct. 12), 1946.

9. Metcoff, J., and McQueeney, A. J. Clinical Malnutrition in Italy in 1945, Nutritional Status of Selected Population Groups. *New England J. Med.*, 235:451–460 (Sept. 26), 1946.

10. Souza, G. H. de Paula. History of the International Sanitary Conventions, 1944. *Epidemiological Information Bulletin* (UNRRA), 1:5–12 (Jan. 15), 1945.